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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/532,855	10/06/2005	Guenter Hoenig	10191/4208	1938

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EXAMINER	
BERNSTEIN, DANIEL A	

ART UNIT	PAPER NUMBER
3743	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/532,855	HOENIG ET AL.	
	Examiner	Art Unit	
	DANIEL A. BERNSTEIN	3743	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 October 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *21-43* is/are pending in the application.

4a) Of the above claim(s) *28-43* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *21-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 April 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *9/29/2008*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 21-22 and 24-25 and 27 rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,003,305 to Martin et al. (Martin) in view of US 5,932,885 to DeBellis et al. (DeBellis) and in further view of US 5,433,174 to Brady et al. (Brady).

In reference to claim 21

Martin discloses a method for operating an afterburner device for the afterburner device (thermal oxidizer 10a) having a nozzle for metering in at least one of fuel (end of supplemental fuel tube 45), residual gases (residual gases from incomplete combustion enter through inlet 17, Fig. 1), and air (air supply tube 44), into a combustion chamber (inside of 10a) that is filled at least in part with foamed ceramics (media 14a made of ceramic foam material, Col. 21 lines 50-55), and having a discharge opening (outlet 19) for discharging combustion gases, the method comprising: recording (combustion control loops inherently store or "record" values measured by a sensor) a speed of combustion (temperature sensors 30 detect the reaction wave and communicates with the control system adjusting the flow of exhaust gases, Col. 4 lines 51-57 and Col. 10 lines 7-23) in at least one of the combustion chamber (sensors 30 are located in the

chamber as shown in Fig. 1) and the foamed ceramics (30 is in communication with the foamed ceramics in 14a).

Martin does not teach recirculating at least a part of the combustion gases to a heat exchange channel that is thermally coupled to at least one of the combustion chamber and the foamed ceramics; and regulating a proportion of the recirculated combustion gases by changing a quantity of the recirculated combustion gases.

DeBellis teaches recirculating at least a part of the combustion gases for the purpose of heating incoming combustion air (see Fig. 4 where combustion gases burned in 104 are directed through a recuperator channel 112 and used to preheat incoming combustion air in channel 14), to a heat exchange channel that is thermally coupled to at least one of the combustion chamber (heat transfer would inherently occur through combustion chamber wall 146 and exhaust gases flowing through channel 112) and the foamed ceramics;

Brady teaches regulating a proportion of the recirculated combustion gases by changing a quantity of the recirculated combustion gases for the purpose of lowering nitrous oxide emissions (Col. 4 lines 47-53).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to combine Martin with DeBellis and Brady for the purpose of having an afterburning device that recirculates exhaust gases for the purpose of transferring heat to the main combustion chamber in response to a low combustion temperature. Martin teaches heating the matrix bed with a pre-heater that

heats the matrix to stabilize the reaction wave (Col. 9 lines 38-63). It would have been obvious to combine Martin and DeBellis, because preheating a matrix is well known and heating a combustion chamber by recirculating exhaust gases is also well known as evidenced by DeBellis. Heating the matrix using a resistive heating element or recirculated gases would be obvious equivalents producing expected results. It would have been obvious to combine Martin in view of DeBellis with Brady to control the amount of exhaust gases recirculated, because preheating combustion air with exhaust gases, which helps increase efficiency and reduce nitrous oxide emissions, can be optimized with a control valve (valve 24 in Fig. 2 stops recirculating gases, Brady). Controlling the amount of exhaust flowing through heat exchange tubes is obvious, because it would be equivalent to turning current on/off when pre-heating the chamber with a resistive heating element. All of the claimed elements were known in prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

In reference to claim 22

The method as recited in claim 21, wherein the recording step includes measuring a temperature (temperature sensors 30, Col.10 lines 24-37, Martin).

In reference to claim 24

The method as recited in claim 21, wherein the quantity of the recirculated combustion gases is regulated based on the speed of combustion in the at least one of

the combustion chamber and the foamed ceramics (Martin teaches a heater 28 that preheats the matrix to establish a stable matrix temperature and a control system 33 that monitors the temperature of the matrix. The combination of Martin in view of DeBellis and Brady replaces the heater 28 with recirculated exhaust gases and therefore, the amount of recirculated gases would regulate the pre-heating of the combustion chamber. The speed of combustion as recited in the specification is based off the recorded temperature).

In reference to claim 25

The method as recited in claim 21, further comprising: regulating a supply of the at least one of the fuel, residual gas, and air, as a function of the recorded speed of combustion (controller 32 controls the flow rate of engine exhaust stream 4 and supplemental fuel stream 5, Col. 10 lines 24-37, Martin. The combination of Martin in view of DeBellis and Brady teaches regulating the exhaust stream to pre-heat the combustion chamber. The speed of combustion, as recited in the specification, is based off the recorded temperature).

In reference to claim 27

The method as recited in claim 21, further comprising: electrically heating at least one of the combustion chamber and the foamed ceramics (resistive heating element, Col. 9 lines 38-63, Martin).

3. Claim 23 rejected under 35 U.S.C. 103(a) as being unpatentable over Martin in view of DeBellis and in view of Brady and in further view of US 6,422,745 to Glasheen et al. (Glasheen).

In reference to claim 23

Martin discloses the method as recited in claim 22, wherein the temperature is measured, but does not teach that the sensor measures temperature via an infrared light measurement. Martin discloses an optical temperature sensor (Col. 10 lines 15-16).

Glasheen teaches a flame sensor that uses infrared light measurement to detect combustion temperature (Col. 1 lines 15-20).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to use an infrared sensor as taught by Glasheen to detect the temperature of combustion in the matrix bed of Martin. There are only so many known options to one of ordinary skill in the art to measure temperature in a combustion chamber. Glasheen teaches that using an infrared sensor to measure combustion temperature is known to one of ordinary skill in the art. Therefore, it would have been an obvious design choice to use an infrared temperature sensor in the matrix bed of Martin based on the temperature range of combustion within the chamber.

4. Claim 26 rejected under 35 U.S.C. 103(a) as being unpatentable over Martin in view of DeBellis and in view of Brady and in further view of US 3,898,317 to Hemsath et al. (Hemsath).

In reference to claim 26

Martin in view of DeBellis and in view of Brady discloses the method as recited in claim 25, but does not teach that at too high a temperature or too great a speed of combustion, a supply of air is increased.

Hemsath teaches that at too high a temperature or too great a speed of combustion, a supply of air is increased ("when a preset temperature is exceeded, additional air is added to reduce the temperature of the gas", abstract, Hemsath).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to combine Martin in view of DeBellis and in view of Brady with Hemsath for the purpose of maintaining a constant temperature in an afterburner. It is well known in the art to increase/decrease airflow to an afterburner to maintain nearly stoichiometric combustion. It is well known in the art to increase the amount of excess air (air in excess of the theoretical stoichiometric quantity for complete combustion of the oxidant and fuel) in order to control the temperature of the combustion chamber as taught by Hemsath. Therefore increasing the supply of air in response to an increase in temperature in the combustion chamber would have been obvious because the claim as recited is a predictable solution to a known problem with a reasonable expectation of success. Increasing the flow of air above stoichiometric levels would eventually lead to a cooling of the chamber.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANIEL A. BERNSTEIN whose telephone number is

(571)270-5803. The examiner can normally be reached on Monday-Friday 8:00 AM - 5:00 PM EDT.

6. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Rinehart can be reached on 571-272-4881. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

7. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DAB

/Kenneth B Rinehart/
Supervisory Patent Examiner, Art Unit 3743